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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/750,004	12/27/2000	Stefan Illek	P00,1975	6618

7590 12/04/2001

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 12/04/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/750,004

Applicant(s)
Illek et al.

Examiner
Bradley Baumeister

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2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Apr 4, 2001
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 4
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

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DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Germany on 8/8/2000 and 11/30/2000. It is noted, however, that applicant has not filed a certified copy of the foreign applications as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-6, 8-10 rejected under 35 U.S.C. 102(b) as being anticipated by Bailey et al. '890 (provided in IDS paper #4). Bailey teaches a transparent crystal 43 having concave, tapered recesses formed in the back side for reflecting light produced at the pn junction (photon-emitting zone) through the surface.

a. Regarding claim 4 requiring only one trajectory of photons be able to proceed to a neighboring elevation, Bailey states that providing deep channels effectively *reduces* (but does

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not totally eliminate) the optical cross-talk between adjacent elements (col. 6, lines 56-64; emphasis added). Accordingly, this claim is anticipated.

b. Regarding claim 10, applicant has not set forth what constitutes “highly doped” for the connecting layer in the specification. The specification’s only reference to doping concentrations appears to be “The connection layer...is doped with a concentration above 10^{16} cm⁻³ in order to assure a good conductivity...” (Specification, page 7, lines 5-). Accordingly, the broadest reasonable interpretation of “highly doped” and the only one supported by the specification is that the concentration must only be above 10^{16} cm⁻³. While Bailey does not appear to expressly set forth the doping levels for the regions, since current is conducted through crystal substrate 43, it must necessarily be doped at least above this level for proper the device to operate as intended. Alternatively, assuming arguendo that Bailey must be interpreted so narrowly as not inherently teaching doping levels above 10^{16} , it would have nonetheless been obvious to one of ordinary skill in the art at the time of the invention to employ doping levels above this concentration for the purposes of providing more efficient carrier conduction and better isolation between the conduction and valence bands of the pn junction, and no unexpected results would be obtained by increasing the doping level above 10^{16} cm⁻³.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey as applied to the claims above, and further in view of UK 2,326,023 (provided in IDS paper #4).

Bailey discloses tapered recesses but does not appear to disclose that the elevations may be formed in the shape of a truncated pyramid. UK '023 teaches individual LEDs having tapered sidewalls for the purpose of increasing the amount of light that is internally reflected from the sidewall towards the top (wider) surface. The elevations may either be truncated pyramids (see e.g., FIG 5) or the recess may be concave or convex (e.g., page 8, second full paragraph). It would have been obvious to one of ordinary skill in the art at the time of the invention to employ truncated pyramids as the particular shape depending only on obvious design considerations such as the relative ease of manufacturing/etching the tapered sidewalls or the resultant optical pattern desired.

a. Regarding claims 11 and 12, UK '023 teaches that the sidewalls (elevations) may be coated with a highly reflective thin film that may be metallic or combinations of dielectrics and metals for the purpose of inhibiting light passage through the sidewalls and further promoting light exiting through the top surface (page 15, first full paragraph). It would have been obvious to one of ordinary skill in the art at the time of the invention to employ reflector

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layers as taught by UK '023 on the elevation surfaces of Bailey at least for this purpose disclosed by UK '023.

6. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey et al. '890 as applied to the claims above. Bailey discloses the general features/conditions of an LED semiconductor 43 having multiple elevations with slanted sidewalls, but does not set forth the specific dimensions of the semiconductor 43. Nonetheless, the dimensions recited do not provide any critical or unexpected results. Rather they are obvious design considerations based on well known optics principles and optical considerations such as the emitters' specific materials, the elevation shape employed and the relative position of the light emission region therein, which in combination, determine the specific angles of reflection, the areas of the escape cones produced, the semiconductor's internal reabsorption coefficient (the mean length traveled within the semiconductor material before a photon is reabsorbed), etc. *See In re Aller*, 105 USPQ 233, holding that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.


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INFORMATION ON HOW TO CONTACT THE USPTO

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at (703) 306-9165. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

B. William Baumeister

December 2, 2001



EDDIE LEE
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